CLAIMS

1. (currently amended) A method for establishing a restoration path for a service in a mesh network having a plurality of nodes interconnected by a plurality of links, the method comprising, at a regional manager for one or more transit nodes of the restoration path:

receiving a service data structure comprising an identification of each link and transit node in a primary path for the service, wherein:

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network; and

each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service, wherein at least one entry of the primary path vector identifies that the corresponding node or link is not part of the primary path for the service; and

determining whether to reserve additional protection bandwidth, on an outgoing link incident to at least one of the one or more transit nodes of the restoration path, using the service data structure, wherein the outgoing link is part of the restoration path.

2. (original) The invention of claim 1, further comprising receiving, at the regional manager, identification of the service, identification of the outgoing link, and bandwidth of the service.

3-5. (canceled)

6. (previously presented) The invention of claim 1, wherein the primary path vector is a primary path node-link vector V_{pnl}.

7. (original) The invention of claim 1, wherein the network is a mesh data network that transmits packetized data.

8. (previously presented) The invention of claim 1, wherein:

the regional manager has a network data structure comprising, for each link in the network and each node or other link in the network, a representation of a minimum amount of protection bandwidth required to be reserved on said each link to restore service upon failure of said node or other link;

the regional manager determines, using the network and service data structures, whether the service requires the additional protection bandwidth to be reserved on the outgoing link of the transit node of the restoration path; and

the regional manager updates the network data structure if any additional protection bandwidth is determined to be required for the service on the outgoing link .

9. (original) The invention of claim 8, wherein:

the network data structure is an array of vectors, wherein:

each vector in the array corresponds to a different link in the network;

each vector in the array has a plurality of entries corresponding to the nodes and links in the network;

for a vector corresponding to the outgoing link, each entry in the vector corresponding to a node or other link identifies the minimum amount of protection bandwidth required to be reserved on the outgoing link to restore service upon failure of the node or other link; and

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network, wherein:

each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service.

10. (original) The invention of claim 9, wherein the regional manager determines whether the service requires any additional protection bandwidth to be reserved on the outgoing link by applying a vector addition operation between the primary path vector corresponding to the service and the vector of the array corresponding to the outgoing link.

11. (original) The invention of claim 10, wherein the vector addition operation comprises addition of corresponding vector entries, wherein the additional protection bandwidth is required if any vector entry sum exceeds a reserved bandwidth on the link.

12. (original) The invention of claim 1, wherein the receiving of a service data structure comprises supporting a signaling protocol interface.

13. (original) The invention of claim 12, wherein the signaling protocol is reservation protocol with traffic engineering extensions (RSVP-TE).

14. (currently amended) A regional manager in a mesh network having a plurality of nodes interconnected by a plurality of links, wherein:

the regional manager manages one or more transit nodes of a restoration path for a service in the mesh network; and

the regional manager is adapted to:

receive a service data structure comprising an identification of each link and transit node in a primary path for the service, wherein:

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network; and

each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service, wherein at least one entry of the primary path vector identifies that the corresponding node or link is not part of the primary path for the service; and

determine whether to reserve additional protection bandwidth, on an outgoing link incident to at least one of the one or more transit nodes, using the service data structure, wherein the outgoing link is part of the restoration path.

15. (original) The invention of claim 14, wherein the regional manager is further adapted to receive identification of the service, identification of the outgoing link, and bandwidth of the service.

16-18. (canceled)

19. (previously presented) The invention of claim 14, wherein the primary path vector is a primary path node-link vector V_{pnl}.

20. (original) The invention of claim 14, wherein the network is a mesh virtual-circuit data network that transmits packetized data.

21. (currently amended) A method for establishing a restoration path for a primary service path in a mesh network having a plurality of nodes interconnected by a plurality of links, ~~wherein the restoration path has been calculated,~~ the method comprising:

receiving a service data structure comprising an identification of each link and node in the primary service path, wherein:

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network; and

each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service; and

determining, for each link of the restoration path, wherein the restoration path has previously been calculated, based on the information in the service data structure, whether to reserve additional protection bandwidth on the link of the restoration path.

22-23. (canceled)

24. (previously presented) The method of claim 21, wherein the step of determining is further based on a network data record for the link comprising a representation of a minimum amount of protection bandwidth required to be reserved on the link to service upon failure of each link and node in the mesh network.

25-26. (canceled)

27. (previously presented) The method of claim 1, further comprising reserving the additional protection bandwidth on the outgoing link, if the regional manager determines that any additional protection bandwidth is required.

28. (previously presented) The method of claim 27, further comprising transmitting from the regional manager information about the additional protection bandwidth for communication to each other node in the network.

29. (previously presented) The invention of claim 14, wherein the regional manager is further adapted to reserve the additional protection bandwidth on the outgoing link, if the regional manager determines that any additional protection bandwidth is required.

30. (previously presented) The invention of claim 29, wherein the regional manager is further adapted to transmit information about the additional protection bandwidth for communication to each other node in the network.

31. (previously presented) The method of claim 21, wherein the steps of receiving and determining are performed at each node of the restoration path.

32. (previously presented) The method of claim 21, wherein the method is performed at one or more regional managers for each node of the restoration path.

33. (previously presented) A method for establishing a restoration path for a service in a mesh network having a plurality of nodes interconnected by a plurality of links, the method comprising, at a regional manager for one or more transit nodes of the restoration path:

receiving a service data structure comprising an identification of each link and transit node in a primary path for the service;

determining whether to reserve additional protection bandwidth, on an outgoing link incident to at least one of the one or more transit nodes of the restoration path, using the service data structure, wherein the outgoing link is part of the restoration path;

reserving the additional protection bandwidth on the outgoing link, if the regional manager determines that any additional protection bandwidth is required; and

transmitting from the regional manager information about the additional protection bandwidth for communication to each other node in the network, wherein:

the regional manager has a network data structure comprising, for each link in the network and each node or other link in the network, a representation of a minimum amount of protection bandwidth required to be reserved on said each link to restore service upon failure of said node or other link;

the network data structure is an array of vectors, wherein:

each vector in the array corresponds to a different link in the network;

each vector in the array has a plurality of entries corresponding to the nodes and links in the network; and

for a vector corresponding to the outgoing link, each entry in the vector corresponding to a node or other link identifies the minimum amount of protection bandwidth required to be reserved on the outgoing link to restore service upon failure of the node or other link;

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network, wherein each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service;

the regional manager determines, using the network and service data structures, whether the service requires the additional protection bandwidth to be reserved on the outgoing link of the transit node of the restoration path; and

the regional manager updates the network data structure if any additional protection bandwidth is determined to be required for the service on the outgoing link.

34. (previously presented) The method of claim 6, further comprising:

reserving the additional protection bandwidth on the outgoing link, if the regional manager determines that any additional protection bandwidth is required; and

transmitting from the regional manager information about the additional protection bandwidth for communication to each other node in the network.

35. (new) A method for establishing a restoration path for a service in a mesh network having a plurality of nodes interconnected by a plurality of links, the method comprising, at a regional manager for one or more transit nodes of the restoration path:

receiving a service data structure comprising an identification of each link and transit node in a primary path for the service, wherein:

the service data structure is a primary path vector having a plurality of entries corresponding to all the nodes and links in the network; and

each entry of the primary path vector identifies whether the corresponding node or link is or is not part of the primary path for the service; and

determining whether to reserve additional protection bandwidth, on an outgoing link incident to at least one of the one or more transit nodes of the restoration path, using the service data structure, wherein the outgoing link is part of the restoration path.

36. (new) The invention of claim 35, wherein:

the regional manager has a network data structure comprising, for each link in the network and each node or other link in the network, a representation of a minimum amount of protection bandwidth required to be reserved on said each link to restore service upon failure of said node or other link;

the regional manager determines, using the network and service data structures, whether the service requires the additional protection bandwidth to be reserved on the outgoing link of the transit node of the restoration path; and

the regional manager updates the network data structure if any additional protection bandwidth is determined to be required for the service on the outgoing link.

37. (new) The invention of claim 36, wherein:

the network data structure is an array of vectors, wherein:

each vector in the array corresponds to a different link in the network;

each vector in the array has a plurality of entries corresponding to the nodes and links in the network;

for a vector corresponding to the outgoing link, each entry in the vector corresponding to a node or other link identifies the minimum amount of protection bandwidth required to be reserved on the outgoing link to restore service upon failure of the node or other link; and

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network, wherein each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service.

38. (new) The invention of claim 37, wherein the regional manager determines whether the service requires any additional protection bandwidth to be reserved on the outgoing link by applying a vector addition operation between the primary path vector corresponding to the service and the vector of the array corresponding to the outgoing link.

39. (new) The invention of claim 38, wherein the vector addition operation comprises addition of corresponding vector entries, wherein the additional protection bandwidth is required if any vector entry sum exceeds a reserved bandwidth on the link.

40. (new) A method for establishing a restoration path for a service in a mesh network having a plurality of nodes interconnected by a plurality of links, the method comprising, at a regional manager for one or more transit nodes of the restoration path:

receiving a service data structure comprising an identification of each link and transit node in a primary path for the service, wherein:

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network; and

each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service; and

determining whether to reserve additional protection bandwidth, on an outgoing link incident to at least one of the one or more transit nodes of the restoration path, using the service data structure, wherein the outgoing link is part of the restoration path, wherein:

the regional manager has a network data structure comprising, for each link in the network and each node or other link in the network, a representation of a minimum amount of protection bandwidth required to be reserved on said each link to restore service upon failure of said node or other link;

the regional manager determines, using the network and service data structures, whether the service requires the additional protection bandwidth to be reserved on the outgoing link of the transit node of the restoration path;

the regional manager updates the network data structure if any additional protection bandwidth is determined to be required for the service on the outgoing link;

the network data structure is an array of vectors, wherein:

each vector in the array corresponds to a different link in the network;

each vector in the array has a plurality of entries corresponding to the nodes and links in the network; and

for a vector corresponding to the outgoing link, each entry in the vector corresponding to a node or other link identifies the minimum amount of protection bandwidth required to be reserved on the outgoing link to restore service upon failure of the node or other link; and

the service data structure is a primary path vector having a plurality of entries corresponding to the nodes and links in the network, wherein each entry of the primary path vector identifies whether the corresponding node or link is part of the primary path for the service.